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City Rank-Size Hypothesis and the Soviet Urban System: 1897-1979

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The regular pattern emerging from empirical tests on the observation of city size distributions, particularly those checking for a rank-size type of distribution in an urban network, has been first identified by Zipf [*Human Behavior and the Principle of Least Effort*, Reading, Massachusetts: Addison-Wesley, 1949].

Harris has applied this method in his extensive study on the cities of the U.S.S.R. and of its component republics, using the 1959 population census data [*Cities of the Soviet Union*, Chicago: Rand McNally and Company, 1970].

The purpose of this study was to extend that analysis, using city population data for each census year available, and to reexamine the city rank-size distribution hypothesis in further detail, subgrouping data from each sample year to observe specific trends.

City population data for the following census years have been extracted from officially available sources: 1897, 1926, 1939, 1959, 1970, and 1979. Separate tests have been conducted, in each census year, to examine the distribution of the following subgroups within each sample: the five largest cities, the medium size group (rank 6-50), the smallest cities group (rank higher than 50), and, finally, the whole sample, including all cities.

Overall, the city rank-size distribution is very close to unity in 1897, under the Tsarist regime, with a slope of -0.979 . Since 1926, the Soviet urban network is characterized by a constant decline of the slope values of the distributions, from an initial -1.100 to a sig-

nificant low of -0.788 in 1979.

The primate pattern of this system is evident with high slope values for the largest cities group, even in 1897 (-1.123). However, two different trends have emerged during the Soviet era: from 1926 to 1959, the slope values first increased, from -1.115 to -1.288 , while since 1959 they steadily decreased to reach a low of -1.086 in 1979. After an initial peak in 1926, the medium size cities group (rank 6 through 50) has shown, in turn, a steady decline up to 1979. High concentration of cities, with roughly similar population size, is dramatized by the particularly low slope values in this group, ranging from -0.609 to -0.592 during the 1959-1979 period.

Another broken pattern represents the evolution of the rank-size distribution of the smallest cities group (rank higher than 50). Until 1939, the trend is upwards, from -1.203 in 1897 up to -1.340 . Then the slope values sharply drop, moving from -1.099 in 1959 to -0.987 in 1979.

In addition to the previous findings, two special aspects should be highlighted. Firstly, the slope values in 1979 are either close to or lower than those of the pre-Soviet era in 1897. Secondly, results for every city group test indicate a declining trend, starting in 1959. As a matter of fact, all values are inferior to -1.0 in 1979, except for the five largest cities group (-1.086), reminding one of the undisputed dominance of the urban system by Moscow and Leningrad. However, if the recent trend persists, the major cities group would also decline below -1.0 by 1990.